

Tri-Agency Weather Discussion: Forecast for Tropical Areas of Interest  
Forecast synopsis 1600 UTC 20 August 2010  
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Summary:

There are currently four systems of interest in the North Atlantic basin on 20 August (Fig. 1). From west to east, these systems are:

1. PGI27L: This disturbance was located just west of the Yucatan Peninsula after making landfall yesterday to the south of Cozumel. The system will continue to move west and dissipate over Mexico tomorrow.
2. PGI30L: Currently located along 20N at 42W and beginning to move west-southwest. The disturbance is devoid of deep convection with areas of percolating convection with cloud tops reaching -40C. PGI30L is a weak pouch with forecasted low values of relative vorticity and Okubo Weiss values. The low-shear and high-moisture environment, however, is conducive for at least maintenance of this disturbance as it moves toward St. Croix. The GV will be investigating this disturbance tomorrow (21 August) with a target of ~19N and ~50W.
3. PGI31L: Remains located to the southwest of the Cape Verdes near 12N/26W embedded within a large band of low-level relative vorticity consistent with the ITCZ. PGI31L will soon ingest PGI33L (located to the northeast) and progress to the west. The models continue to favor development of this system with a west-northwest track through 120h. Beyond 5 days, the global models are inconsistent with the track of this system as it recurves into the midlatitudes.
4. PGI33L: located to the Northeast of PGI31L to the west-southwest of Senegal at 13N/19W. Guidance suggests this system will merge with PGI31L over the next 24–36 hours.

Discussion:

*a. Synoptic*

Broad upper-level easterly flow was observed over the Southeast U.S. and the Gulf of Mexico on the poleward side of a weak trough that's persisted over the Caribbean (Fig. 2). Weak anticyclonic flow was observed over PGI27L in association with weak convection in the Bay of Campeche. The cold low mentioned in previous discussions was located to the north of Puerto Rico and was moving westward. The cyclonic circulation associated with this feature has merged with cyclonic flow on the southwest portion of the upper-level trough. Over the central North Atlantic a small-scale region of enhanced water vapor represented the location of PGI30L at 20N;-40W. Upper-level east-northeasterly flow is indicative of the systems movement to the west southwest.

Farther east in the North Atlantic a weak upper-level trough was lifting poleward over northwest Africa (Fig. 2). The movement of this upper-level trough will re-establish the subtropical anticyclone over the eastern North Atlantic and western Africa, finally allowing for a more westerly movement of PGI31 and PGI33.

*b. PGI27L*

PGI27L is located just west of the Yucatan Peninsula after making landfall yesterday to the south of Cozumel. Convection is quite sporadic and mainly located west of the pouch center. The system has almost no chance for undergoing genesis as it continues to move west and is expected to dissipate over Mexico tomorrow.

### *c. PGI30L*

PGI30L was located along 20N and at 42W early on 20 August and continues to move west-southwest. The warm-core system contains a reasonable amount of low-level relative vorticity and anticyclonic thermal vorticity through a deep layer (Fig. 3). The system is in a region characterized by high TPW values > 50mm (See Fig. 1) with deep-layer wind shear values generally less than 10 knots. A mid-altitude dry air intrusion with possible mid to upper-level subsidence is located just west of PGI30L, while a SAL outbreak is located to the north and east of the system. The region of low to mid-level moisture surrounding PGI30L appears to be shrinking over the past day or so as these dry air masses have begun to slowly impinge on the system. Model tracks for PGI30L take the disturbance to the west-southwest with time and over a region with slightly warm sea surface temperatures. While convection is currently limited, the environment in the near future may be conducive to additional convection with decreasing shear values and increase SSTs. ECMWF Lagrangian pouch products for PGI30L suggest that the system will continue on a west and west-southwest track toward St. Croix with maintaining values of low-level relative vorticity and near-zero Okubo-Weiss parameter values. (Fig. 4a) TPW and relative humidity values will remain relatively high (>50mm and >80% respectively) in the 3-degree by 3-degree domain with weak shear values through 72 hours. After 72 hours, an increase in environmental shear is expected as the disturbance nears a subtropical jet in the North-central Caribbean. The GFS solution is comparable to the ECMWF, however, the pouch is no longer trackable beyond 84 hours (Fig. 4b).

### *d. PGI31L and PGI33L*

PGI33L will soon be ingested by PGI31L and will not be discussed. PGI31L contained large low-level relative vorticity values and was embedded with a band of convection that likely comprised the ITCZ near ~19Z/20 (Fig. 5). PGI33L was located to the northeast in a secondary low-level relative vorticity maximum. Both systems were located in TPW values >55–60mm (not shown) and equatorward of a Saharan Air-layer. Model tracks for PGI33L take the system to the west northwest as midlatitude easterly flow intensifies (discussed above). Lagrangian Pouch diagnostics from the ECMWF and GFS for PGI31L suggest that low-level relative vorticity and Okubo-Weiss parameter values following the system will increase rapidly over the next 24–36 hours (Fig. 6). The system will remain embedded within an environment with large TPW and relative humidity values approaching 70mm and >80%, respectively.

### *e. Forecast*

A fair amount of uncertainty exists in the track of PGI31L in the North Atlantic, with implications on planning for the current field projects. The consensus for the tracks of PGI30L and PGI31L is displayed in Fig. 7. Currently, we expect PGI30L to move to the North of St. Croix on Monday 23 August and for PGI31L to begin to recurve into the North Atlantic by Thursday 26 August. The track of PGI31L is highly uncertain based on a 50-member ensemble for PGI31L in Fig. 8. The track uncertainty can be linked to large variability between the global models on the development and evolution of midlatitude weather features that will ultimately impact the subtropical anticyclone over the North Atlantic (not shown). The 50-member ensemble also depicts the ensemble location of the next wave, which will be moving off of Africa soon, in the central Atlantic and a following wave in the East Atlantic by 28 August. Of note, a large number of members in the ensemble depict circulations of various intensities over the Gulf of Mexico and Southeast U.S....

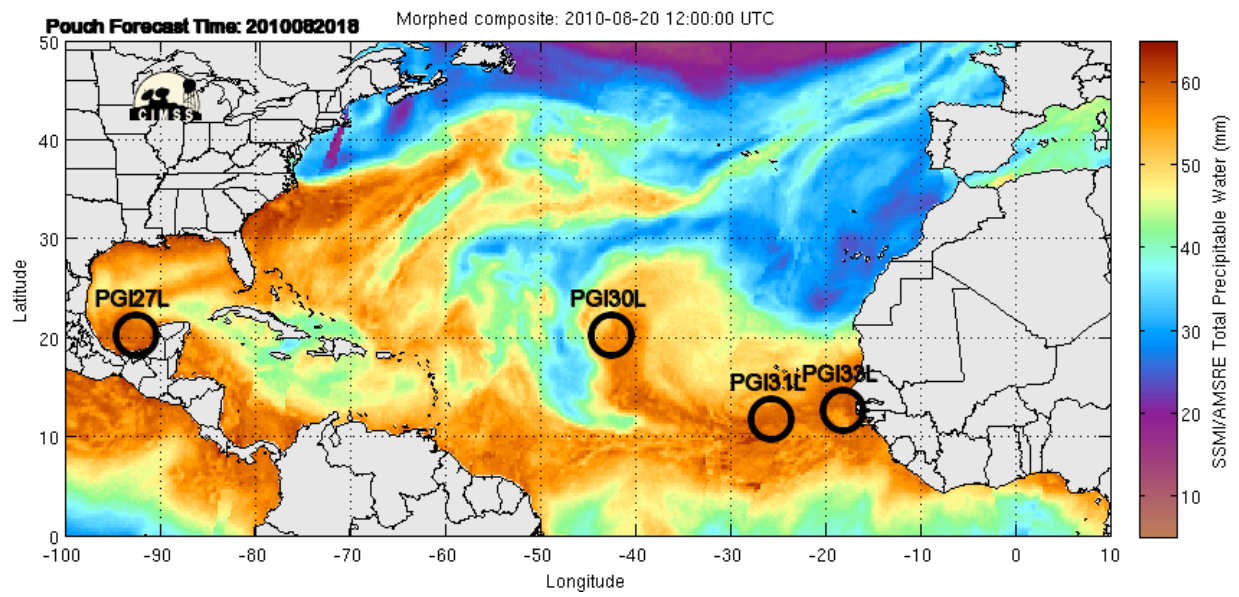


Fig. 1.

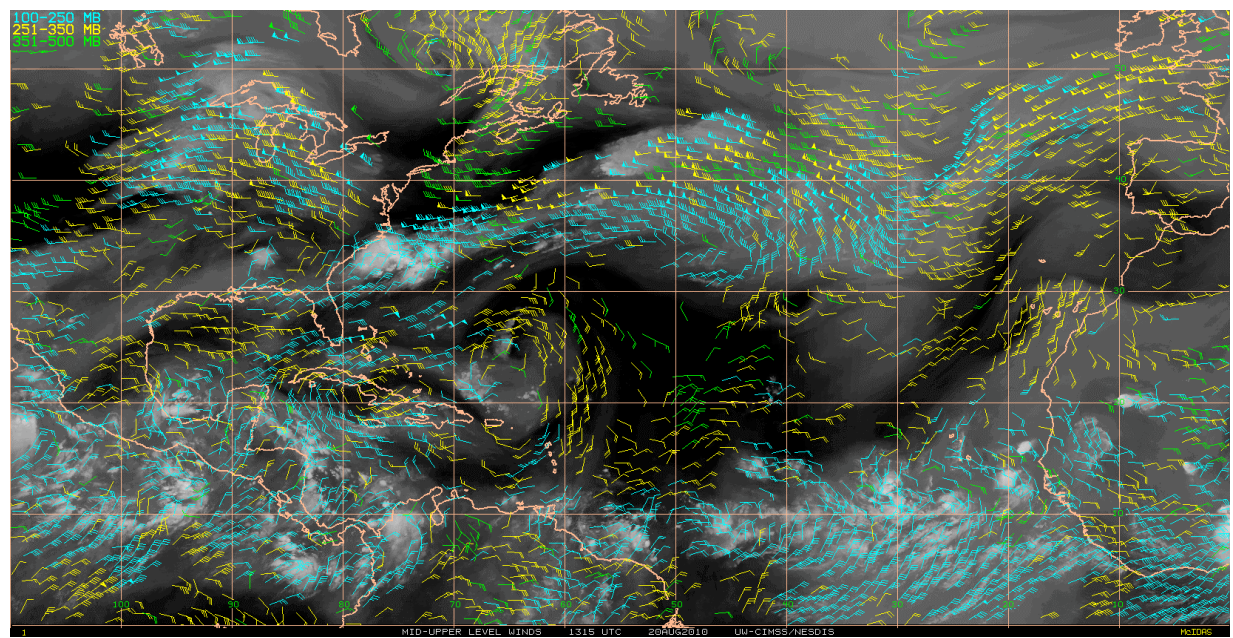


Fig. 2.

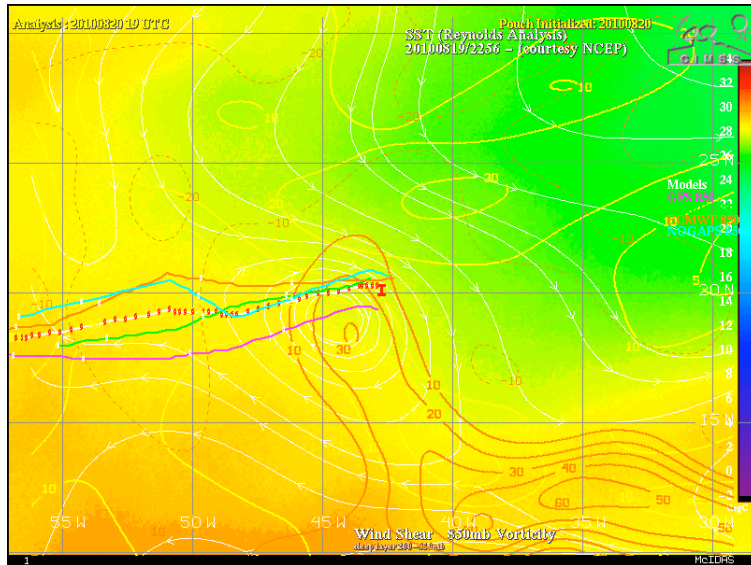


Fig. 3. Reynold's SST (shaded), 850-hPa relative vorticity (contoured in brown), 850-200-hPa shear (contoured in yellow), and model-forecast tracks for PGI30L.

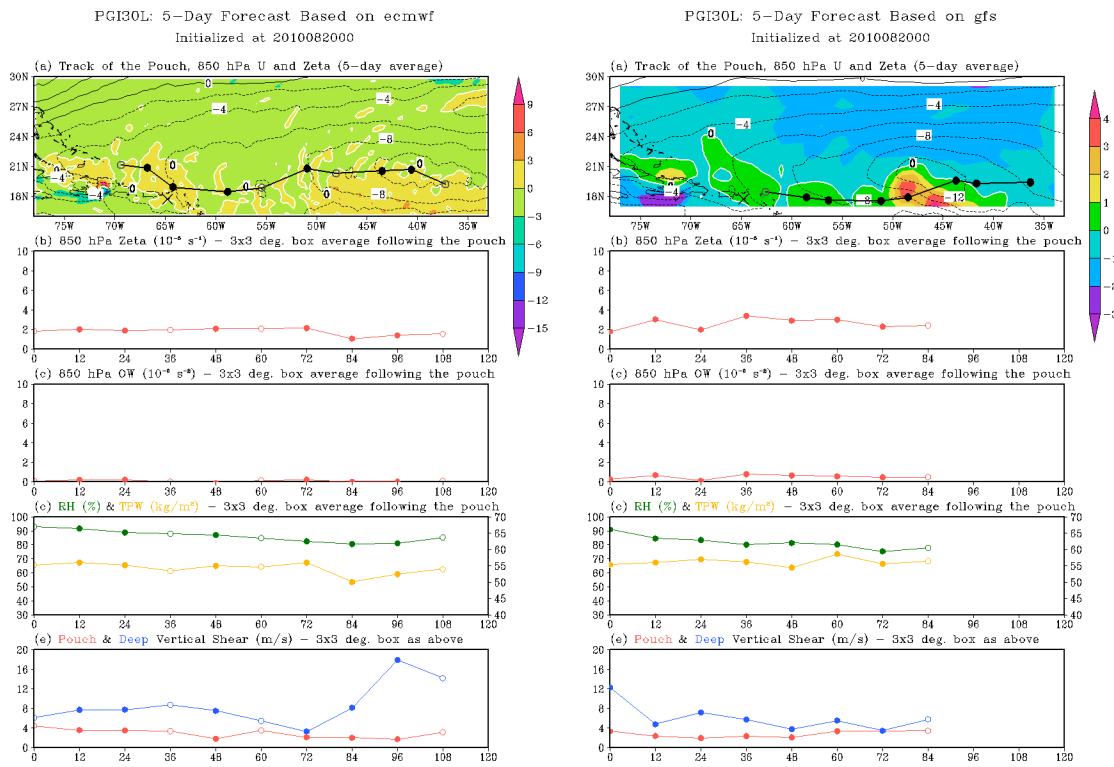


Fig. 4



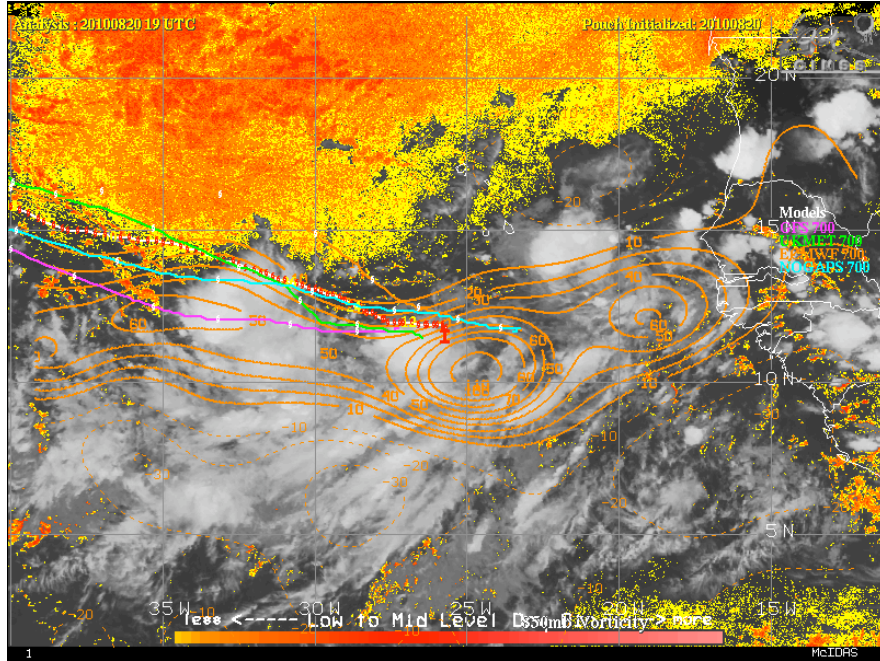


Fig. 5. Fig. 3. CIMSS SAL product (shaded), 850-hPa relative vorticity (contoured in brown), and model-forecast tracks for PGI30L.

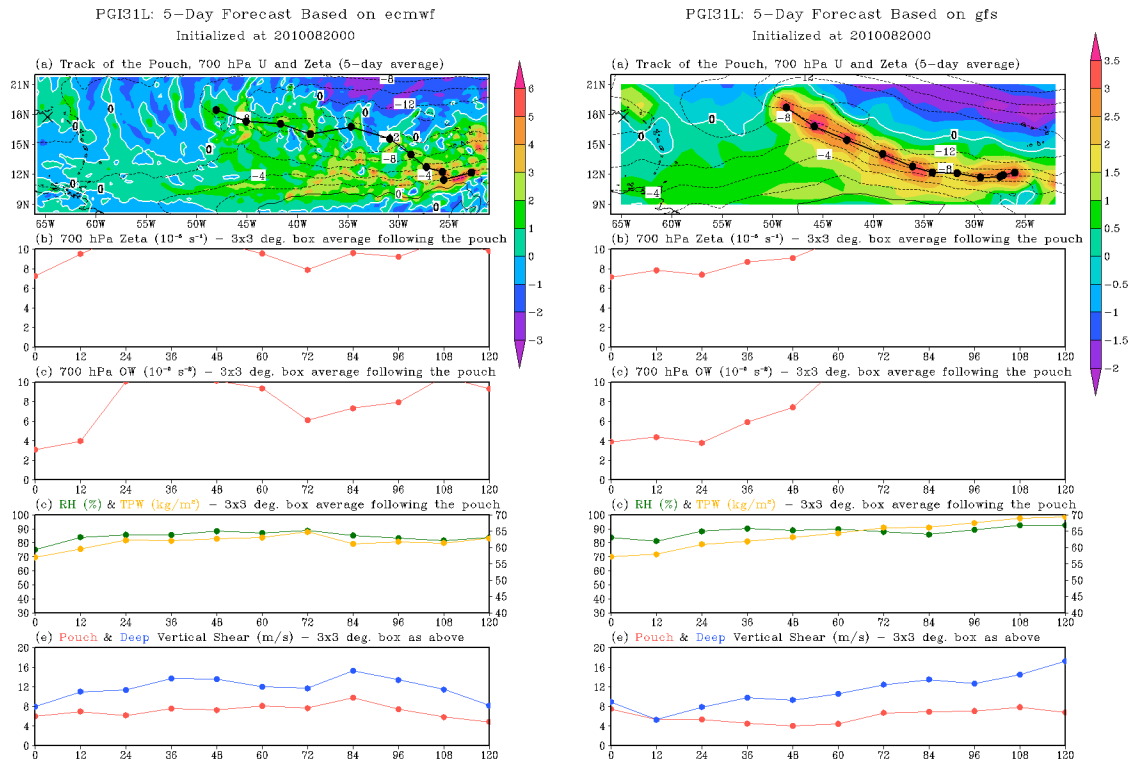
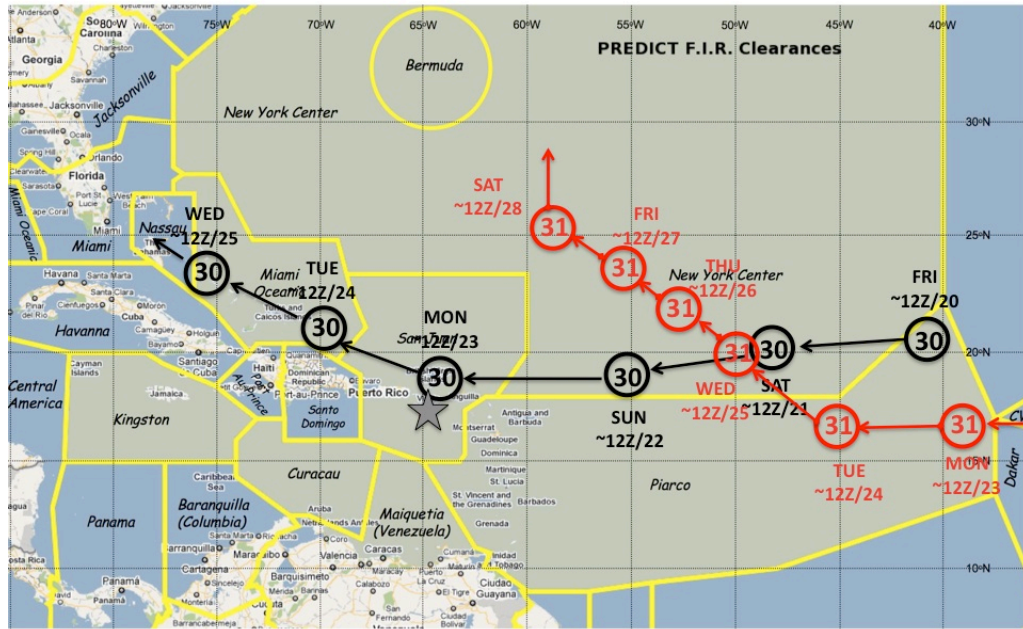


Fig. 6

PGI positions based on 0000 UTC 20 August ECMWF



\*PGI 33 becomes absorbed by 31 and are tracked as a single disturbance

Fig. 7

Gray: ECMWF 192-hour CTRL streamlines of 700–850 hPa ave wind. Init. 2010082000, Valid 2010082800. Color: Contours of 700–850 hPa CIRC  $\times 2.5e-5 \text{ m}^2 \text{ s}^{-1}$  and 200–850 hPa THICK ANOM  $\times 20 \text{ m}$ . 50 members.

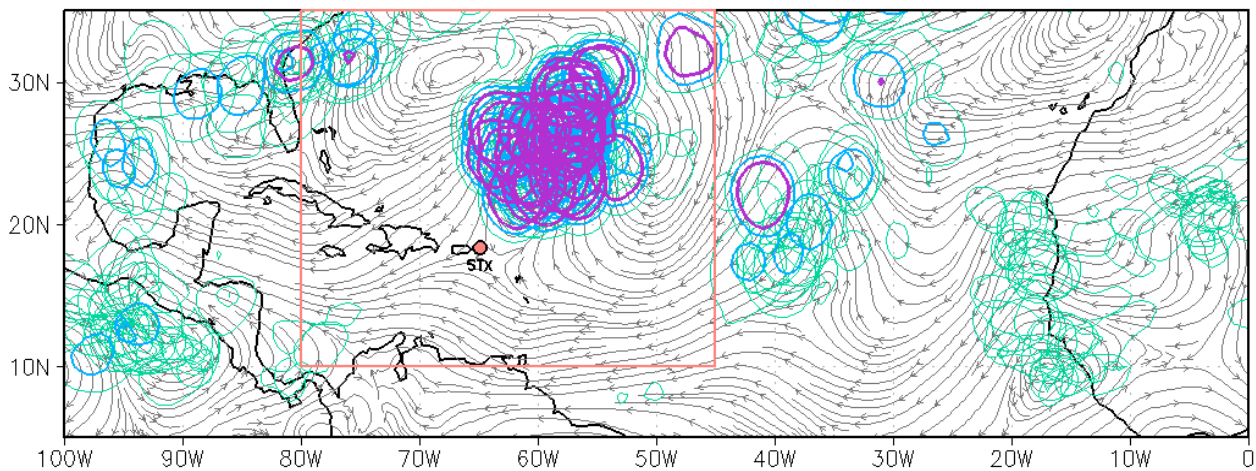


Fig. 8